In order to secure for a work of this kind the fair trial which it so thoroughly deserves, we venture to make an appeal to the great body of examiners, in whose hands lies so much power for influencing, either for good or ill, the character of mathematical teaching in schools. A paper on elementary algebra is too often a medley of questions, generally of a stock type, which do, indeed, test the candidate's familiarity with certain set rules, and to some extent his ingenuity in applying them, but are very far from gauging his powers of mathematical reasoning. So long as this is the case, a premium is offered to radically bad methods of teaching. A boy can be taught the rule for algebraic long division in a very short time, without any attempt to make him understand its object or principle; and what is the use of wasting time upon such superfluities, when we can take him on to the practice of G.C.M., and thus enable him to make sure of answering two questions in his examination? Now it is quite possible to combine questions on set rules (and it would be absurd to propose the entire omission of them) with fair and simple questions on matters of principle: if this were done, it would be a great encouragement to a good teacher, and tend to raise the average standard of instruction.

The book being so good, it is worth while to call attention to the points in which it appears capable of improvement. First of all, sufficient emphasis is not laid on the fact that in *applications* of algebra the signs + and − are used both as symbols of operation and also as indications of quality, or "sense": that this is possible, without causing confusion, is not obvious *a priori*. Thus, in the case of steps, let πa mean a step of a units to the right, νb a step of b units to the left, and let + and − refer, in the usual way, to the composition of steps: then we have formulæ such as $\pi a + \pi b = \pi(a + b)$, $\pi a - \nu b = \pi(a + b)$, $\pi a + \nu b = \pi(a - b)$ or $\nu(b - a)$ according as $a >$ or $< b$, and so on. If we write + and − for π and ν throughout, apply the formal rules $+(+a) = a$, $+(-a) = -a$, &c., and then interpret the sign of any result qualitatively, *i.e.* as π or ν according as it is + or −, the conclusion is correct, and the same as if the complete notation had been used throughout. This remark is due to De Morgan, and has been strangely ignored by subsequent writers.

The expression "latent sign" occurs without explanation, and apparently for the first time on p. 64. This is a point which often puzzles beginners, and might well receive a little attention.

Chapters xvi. and xvii., on irrational functions and surds, are a miserable compromise, as Prof. Chrystal is evidently aware. Arts. 169–74, 181–84, should have been omitted altogether; this would leave room for other illustrations, especially of Art. 172. Most of the examples, too, are of a thoroughly unpractical type; they might, perhaps, be put in an appendix as samples of the curious trifling of examiners.

Arithmetical Progression is without value in itself, but affords capital exercise in what may be called algebraical counting [99·9 per cent. of ordinary students say that the nth term is $a + nd$], in the derivation and use of a general formula, and many things besides. For these reasons it might be discussed at an earlier stage; the formula $s = \frac{1}{2}n(a + l)$, which, by the by, is not given, may be illustrated by two pieces of paper cut in the shape of the side elevation of a staircase.

In treating Geometrical Progression, it might be well to prove, without using the binomial theorem, that as n increases indefinitely r^n becomes infinite or infinitesimal according as $|r|$ exceeds or falls short of unity. This would enable the teacher to take it earlier, if he wished.

Two additions might very well be made in the interest of technical or scientific students. The principle used in calculating the slope of a graph from its equation might be explained and illustrated; and it might be stated, without proof, that the binomial theorem is true for all rational values of n if x is a proper fraction, and hence deduced, or proved separately, that $(1 + x)^n = 1 + nx$ approximately, whenever x and nx are both small.

Another thing that might easily be done would be to introduce examples involving complex quantities in the later chapters, for instance those on partial fractions, on proportion, and on series. Purely algebraic work with complex quantities is too much neglected, and the sooner a student becomes familiar with it the better.

As might be expected, there are very few definite inaccuracies; there is, however, a rather striking one at the top of p. 68. It is, of course, untrue that "the larger n the more slowly does x_n increase between $x = 0$ and $x = +1$"; and this slip is the more remarkable because it is contradicted by the figure on p. 67. The tyro may amuse himself by finding the value of x for which x^m and x^n are increasing at the same rate.

G. B. M.

THE CUNEIFORM INSCRIPTIONS OF WESTERN ASIA.

First Steps in Assyrian. By L. W. King. Pp. cxxxix + 399. 8vo. (London: Kegan Paul and Co, Ltd., 1898.)

THE appearance of Mr. King's volume, with its modestly worded title, is opportune, and we think it likely that it will be welcomed by every student of the literatures of the East. The author's avowed object is to help the student of the cuneiform inscriptions who has, as yet, made but little progress in his difficult work, but there is little doubt that Mr. King's stout volume will be of considerable use to others besides him.

The readers of NATURE will remember that attention has been called in these pages to the series of important texts which the Trustees of the British Museum have recently issued, and those who have taken the trouble to examine the various parts as they appeared will have found that, with the exception of short prefaces which roughly classify the texts, no detailed information of their contents has been given. Any translations, or even good summaries of the contents of most of the texts, are, in the present state of Assyriological knowledge, impossible; and if we consider for a moment that not only is the language in which a large section of the documents is written imperfectly known, but also that the readings of several of the signs are doubtful, this fact will not appear wonderful. It must not, however, be imagined that Assyriologists are beaten, far from it; but they ask for time, and time must be given to them. Their chief necessity is, of course, the texts, and the sooner these are put into

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their hands the better for the progress of Assyriology. Another want is students to work at the Accadian, Sumerian, and Semitic inscriptions which are now available in abundance, and it is much to be hoped that Mr. King's book will induce young men of means and leisure to devote themselves to these most important subjects.

About thirty years ago, when the late Sir Henry Rawlinson and Mr. George Smith were working through the masses of inscribed clay fragments from the Royal Library at Nineveh, it was commonly thought that the originals of the early portions of Genesis would be found among them, and the identification of the Story of the Deluge which Mr. G. Smith published in 1870, greatly stimulated the hopes of the theologian and historian. As a result the most absurd expectations were formed, and for some years after this date, the study of cuneiform was cultivated by many solely with the view of discovering parallelisms and "proofs" of the Bible narrative. Attempts were made by Oppert, Schrader, Sayce, and others to formulate a grammar of the cuneiform inscriptions, and their works were instrumental in setting the subject on a firm base. Semitic scholars in general were somewhat sceptical, but that is hardly to be wondered at when we consider the colossal ignorance of general Semitic grammar which some of the early Assyrian "scholars" displayed in their publications. Since that time, however, the knowledge of the cuneiform inscriptions has increased greatly, and Mr. King's book is a proof of this fact; to some who have gone on crying persistently that Assyriology is "uncertain" and "nebulous" it will come as an unpleasant surprise. Roughly speaking, it may be divided into three parts: (1) Grammar; (2) cuneiform texts; and (3) vocabulary. In the first part Mr. King describes briefly the origin and rise of our cuneiform knowledge, and gives a tolerably full sketch of Assyrian grammar, with sign lists, lists of ideographs, &c. In the second part we have a series of forty-two complete extracts from cuneiform compositions of all periods from B.C. 2200 to B.C 600; these comprise historical, mythological, religious, magical, epistolary and other texts, including the Tell el-Amarna tablets. In the third part are a number of cuneiform texts, specially arranged to enable the beginner to test his own knowledge and to gain experience and confidence in deciphering new compositions, and a complete vocabulary to the whole book. From beginning to end cuneiform type is used, and as the fount is of the same size as that employed by the late Sir Henry Rawlinson, it will not be found troublesome to the eyes. The full transliterations and translations will materially help the beginner, and even the more advanced student will, at times, be glad of them; and, as far as we can see, Mr. King is abreast of all the modern readings and renderings adopted by American and German scholars. We notice that he follows those who read the name of the plague-god Ura, and has no doubt good reason for so doing; it seems, however, that Father Scheil has found the name spelt Dibbara, syllabically, which reading agrees with that suggested by Harper, Delitzsch and others.

It is to be hoped that Mr. King's book will attract new workers to the field of Assyriology, and that it will lead them eventually to the unravelling of the meanings of the difficult texts, which were written in the most complex of characters by Semitic and non-Semitic peoples alike at the dawn of civilisation.

THE NEBULAR HYPOTHESIS.

Essai synthétique sur la formation du Système Solaire; première partie: formation du système. Par M. le Général Lafouge. Pp. ix + 226. (Chalons sur Marne: Martin Frères, 1898.)

THE nebular hypothesis of the origin of the planetary system, presented by Laplace "avec la défiance que doit inspirer tout ce qui n'est point un résultat de l'observation ou du calcul," is now just over a century old. At the time of its conception weak points must have been apparent, probably to none more clearly than to Laplace himself, although the main points of his theory are displayed with a concise lucidity, which is unfortunately rarely to be found in the works of later writers on the same subject. And now, after years of criticism and counter suggestions prompted by speculations both rational and irrational, the hypothesis stands very much in its original position. Its inadequacy in some special directions has, it is true, become more fully realised as fresh facts have arisen to be explained. We are not concerned here in mentioning the particular directions in which the original hypothesis stands in need of support, further than to point out that the author has not given particular attention to these difficulties. Without entering into objections, which Lord Kelvin and others have raised from purely theoretical considerations, it will be sufficient to mention that the symmetry which is found to exist in the arrangement of the planetary system offers a difficulty to which no adequate answer has been found. No mathematical proof has yet been given, nor is it given in this book, to show that a ring of vapour surrounding the sun or central mass could condense into a single planet of considerable mass. The conditions supposed by Laplace seem more favourable to the formation of a swarm of small bodies more resembling the asteroids, or bodies of even lesser bulk, than that of a system of planets, encircled by satellites. Nor does the simple observation of nebulæ in the sky contribute any material support to the original theory. Those nebulæ whose construction can best be studied in the telescope do not present that regularity of outline or condensation, which would seem to be demanded by the construction of such regular mechanism as the solar system possesses. But the fundamental principle contained in Laplace is that the formation of the planetary system is the result of a process rather than of an act, and this suggestion remains practically undisputed. If the details and facts by which Laplace sought to maintain his hypothesis have received little confirmation since his time, it is still safe to say that his generic thought has not been refuted after a century of research. Indeed research has had little direct bearing on the subject, with the exception of two most remarkable investigations: the one, that of M. Poincaré on the possible forms of equilibrium of a rotating fluid mass; the other, the great work of Prof. G. H. Darwin on the effects of tidal action.

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